OPTIMUS RIDE

CITY of BOSTON

Q4 2020 TO Q2 2021

Optimus Ride Progress Report

Autonomous Vehicle Testing – City of Boston

About Optimus Ride

Optimus Ride designs, builds, and operates customized electric and autonomous transportation solutions for low-speed geofenced locations, from residential communities and mixed-use developments to office/industrial parks, ports, airports, academic campuses, and city zones. Our company is based out of the original Autonomous Vehicle Testing Zone in Massachusetts, the Raymond L. Flynn Marine Park within Boston's Seaport District. Here, we conduct the majority of our research and development activities which prepare our autonomous mobility system for commercial deployment. To date, we have had commercial deployment programs in California, Massachusetts, New York, Virginia, and Washington, D.C. Each system is tailored to meet community needs for passenger service and last-mile logistics. We are grateful for the continuous support we have received to test automated vehicles on public ways in Massachusetts. Your work makes our research, development, and commercialization efforts possible. Thank you.

Testing Activities

Over the past three quarters, we have driven over 2,000 miles in the Marine Park and South Boston Seaport. Though we have continued to test advances in our autonomous driverless system (ADS) on the approved public roads, the bulk of our efforts in the area have been conducted in manual mode. Traffic, pedestrian, and cycling activity remain low in the area compared to Q1 2020, with a majority of road users entering the region during business hours. We will continue to evaluate and report on road user activity on our approved road networks, as a density of road users is beneficial to our data collection and testing efforts.

Given limited road users in the region, we are advancing the serviceable operational design domain (ODD) of our vehicle by focusing heavily on manual data collection and sensor testing related to weather, including snow, rain, wind, and fog. To establish a baseline, we installed a weather station outside of our Seaport headquarters to collect independent weather data. During inclement weather days, our engineering and operations teams take our fully-equipped vehicles out to collect data in manual mode.

Though we make continuous improvements to our inclement weather service operations in autonomous mode, our current efforts involve testing sensor configurations in various weather conditions to evaluate their performance and eventually determine which sensor configuration we select for our commercial fleet. With significant advances in the production and quality of LiDAR, radar, camera, etc., sensors in the past two years, we seek to select and deploy the most effective configuration to improve real-time data capture and how our ADS will handle inclement weather.

Ultimately, as our vehicle becomes more adept at handling inclement weather, ride smoothness will increase as a benefit of improved vehicle maneuvering and our passengers will experience a more comfortable ride.

Quarterly Reports - Operations

Q4 2020

Beyond expanding our inclement weather testing and data collection, during Q4 2020, we made significant organizational advancements in our testing operations vertical. Developed as a collaboration between our Safety and Systems Engineering and Field Operations departments, the Testing Operations department is exclusively responsible for ensuring the safe and robust testing of our ADS. During Q4, we defined the responsibilities of the group, including their role in coordinating, executing, and reporting on testing activities. We also carried through our safety culture mission from the outset, ensuring that all Testing Operations staff felt comfortable and equipped to report issues concerning safety enhancements and incident management. As part of an ongoing effort to train our Vehicle Operations Specialists on advanced vehicle handling, we sent employees from Safety and Systems Engineering, Field Operations, and Testing Operations to an external advanced vehicle handling course with a local non-profit. Here, employees learned advanced vehicle handling skills including situational awareness, anti-distraction methods, and emergency avoidance maneuvers.

On the commercial service side of Optimus, we prepared to transition our passenger service at The Yards in Washington, D.C., from a goods delivery service to passenger service. To accomplish this transition to passenger service, we built our own ride-hailing native app, Opti Ride. Built with standard ride-hailing features, the app continues our journey to commercialize self-driving technology and make first-last mile transportation more accessible to all. For more information, please visit Opti Ride on the iOS App Store for Apple devices or the Google Play Store for Android devices.

Q1 2021

Given the slowdown in road activity in the Seaport, we utilized this period of return-to-office to prepare for increased on-road testing activities in the second half of the year. After officially launching our Testing Operations function in Q4 2020, we began to further staff our team in Q1 2021. We hired a Testing Operations Lead to support the interdepartmental collaboration and began

hiring and allocating Vehicle Operations Specialists and Testing Specialists to the team. We also decided to invest further in two key support areas for Testing Operations - the training and development of our team and the operational robustness of our testing facilities. This led us to create two new positions on our team - a Training and Auditing Manager and a Fleet and Facilities Lead - to join Optimus in Q2.

In preparation for the new Fleet and Facilities function to launch in Q2, we conducted inspections of our vehicle fleet. After operating on public roads for 4 years, we felt ready to begin the process of de-fleeting some of our vehicles, especially our commercial passenger vehicles which have delivered thousands of rides. Following the 2019 Memorandum of Agreement de-fleeting rules, we stripped a group of vehicles of any ADS-related features including sensors and computing equipment. After the vehicles were properly deprecated, we transferred the vehicles to a decommissioner.

Commercially, during this time, our engineering, operations, and product teams focused on launching passenger service at The Yards, D.C. We established our service routes, pick up and drop off locations, and launched community engagement efforts to get ridership for our new service.

Q2 2021

After hiring our Training and Auditing Manager, an expert in adult learning theory and capacitation, we began the process of evaluating our current materials to ensure our Vehicle Operations Specialists receive world-class training on operating autonomous vehicles. After close consideration, our training program is being redesigned to incorporate additional learning methods to supplement classroom instruction and on-vehicle training. This new training program will be hosted on a learning management system, providing further insight into our employees' progress and enabling us to make quicker and more frequent updates to our training materials. As we proceed, we will also develop more content for our employees to review, ranging from our commitment to creating a safety culture to providing excellent customer service.

Our Fleet and Facilities lead also worked on scaling up our preparations for the Testing Operations function this quarter. For example, we drafted new fleet management processes enabling us to scale our fleet in size and distribution around the country. We also purchased additional test assets, such as different types of road user dummy mannequins, to support our testing initiatives. Combined with the new Training and Auditing program, our new Fleet and Facilities function will

continue to build our safety culture from the first time our ADS is road tested to when it is experienced live during service operations by our customers.

COVID-19 Update

We continue to cautiously and gradually open up access to our headquarters. Out of an abundance of caution, we continue high sanitation practices within our office. We additionally encourage our employees to vaccinate and report their vaccination status. Our employees continue to be able to work from home - or on a reduced in-office schedule - to promote their health and wellbeing. While our employees are out testing in the vehicles, we are maintaining a mask requirement. Physical dividers remain installed in our vehicles as well. At our deployment sites, our sanitation protocols remain as well. We are currently evaluating whether to keep our row dividers for our employees given their impact on rider experience while also enabling a path forward for them to experience a driverless vehicle.

Community Engagement

Our team looks forward to engaging our communities - and new audiences - in Massachusetts as restrictions ease up. Where possible, however, we have been trying to engage with our site communities. For example, at our location in Washington, D.C., we are beginning to host pop-up events including tabling and demos to educate the general public about our autonomous system and introduce them to our service routes around the Capitol Riverfront neighborhood. In Brooklyn, we hosted extended service hours to support a local, socially-distant music festival called BAM hosted throughout the Brooklyn Navy Yard. We hope to meet more community members soon!

Takeovers

The takeover methods used in Optimus Ride's vehicles are designed to ensure that the Human Machine Interface (HMI) is clear, consistent, gives context, and provides operators the necessary feedback about the system. The system is designed to disengage autonomous control and enable manual control by the safety driver when a takeover is initiated. The safety driver can immediately take control using the brakes, throttle, or steering wheel, for example. We have no notable takeovers to report over the past three quarters given the significant reduction of road users in the Seaport and Optimus Ride's on-road testing focused on manual data collection.

General Report

Feedback for Municipal and State Transportation Stakeholders

During the past few quarters, the roundabout between Haul Road and Northern Ave was re-striped and converted from a single lane to two lanes. We have observed that it is unclear what the proper rules are to enter the roundabout, specifically who has the right of way for entry into the roundabout. This has increased the risk of accidents in the area, with several of our employees reporting near misses in their private vehicles as well.

Goals for Current and Future Testing, and/or Proposals for Changes

We aim to continue our testing evaluation of sensor suites which allow us to increase our ODD in inclement weather conditions. Additionally, we look to continue collecting data to evaluate our system's capability to operate in more complex traffic scenarios -- especially as more road users travel into the Seaport.

Description of all ADS system failures, citations, or violations received during testing

After Q4 2020, Q1 2021, and Q2 2021, Optimus Ride conducted an internal audit of ADS system failures, citations, and violations received during testing. For this period, Optimus Ride has no system failures, citations, or violations to report.

Pilot Service Tests

Optimus Ride is not providing pilot service tests at this time in the State of Massachusetts. For more information regarding the services we provide, our commercial deployment sites, or general inquiries, please refer to our website: www.optimusride.com.